GENOTOXICITY AND MOLECULAR EFFECTS OF FENVALERATE ON EXPERIMANTAL ANIMALS AND PROTECTIVE EFFECT OF CURCUMIN ON THE SAME PESTICIDE

BY

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B.Sc. Agric. Sci. (Biotechnology), Fac. Agric., Cairo Univ., 2004

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APPROVAL SHEET

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Title of Thesis: Genotoxicity And Molecular Effects Of Fenvalerate On Experimental Animals And Protective Effect Of Curcumin On The Same Pesticide

Supervisors: Dr. Fouad Abd El Reheim Ahmed
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ABSTRACT

Esfenvalerate a synthetic pyrethroid insecticide, is widely used in the home environment and in agriculture because of its high activity against a broad spectrum of insectpests and its low animal toxicity The objective of this study was to investigate the toxicity of pyrethroid insecticides on liver tissues of rats and the possible role of antioxidant plant (curcumin) as a protective agent against oxidative stress , genotoxicity and histological alterations. forty male albino rats were divided into 8 groups of 5 rats /each: G1: served as control and G2: served as positive control received (100mg/kg curcumin), G3,G4 and G5 had oral administration (1/20 LD50, 1/40 LD50 and 1/60 LD50 of esfenvelerate) respectively and the last three groups(G6,G7and G8) were received the same doses of pesticide plus 100mg /kg curcumin for 28 days daily. animals were sacrificed and bone marrow samples were collected for chromosome aberration assay test and liver samples were used for DNA damage detection by comet assay. exposure of rats to (esfen) induced significant increase in the levels of MDA and significant decrease in total protein , GSH ,SOD and catalase whilst the insecticides doses plus curcumin showed decrease in MDA for high and medium dose and ameliorated the reduction of total protein concentration in low dose while induced chromosomal aberrations (CA) such as centromeric gaps, chromatid gaps, chromatid deletion, dicentricchromosome, and ring chromosome. the alkaline comet assay showed significantly increased tail moment, taillength and tailed % in liver cells of animals treated with esfenvelerate alone compared to control group. On the other hand, oral curcumin significantly ameliorated the genotoxicity induced by esfenvelrat. All these results suggest the efficacy of curcumin in amelioration chromosomal aberrations of structures as well as DNA damage , oxidative stress burden and histological damage.which may result from its antioxidant properties.

Key words : pyrethroid insecticide, curcumin , genotoxicity, oxidative stress alkaline comet assay

DEDICATION

I dedicate this work to whom my heartfelt thanks; above all, Allah, then to my family including mother, father ,wife and my kids for their patience , help &support along the period of my post-graduation

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LIST OF ABBREVIATION AND INITION

B.Wt **:** Body weight

CAT **:** catalase

CA **:** Chromosomal aberration

DNA **:** Deoxyribose nuclic acid

EC **:** Emulsion concentration

GABA **:** Gamma-Aminobutyric acid

GSH **:** Reduced glutathione

GST **:** glutathione-S-transferase

GSSG **:** Glutathione disulfide

GR **:** Glutathione reductase

GP_X **:** Glutathione peroxidase

HBSS **:** Hank's Balanced Salt Solution

LCT **:** lambda cyhalothrin

LC_{50} **:** Median lethal concentration

LD_{50} **:** Median lethal dose

LPO **:** Lipid peroxidation

MDA **:** Malonyldialdehyde

MN **:** micronuclei

PBS **:** Phosphate-buffered saline

ROS **:** Reactive oxygen species

SCE **:** sister-chromatid exchanges

SCGE **:** **s**ingle-cell gel electrophoresis

SDS **:** sodium dodecyl sulphate

SOD **:** super oxide dismutase

TL **:** Tail length

TD **:** Tail DNA

TM **:** Tail moment

VSSC **:** Voltage-Sensitive Sodium Channels